



An Epidemiological Analysis of the Relationship Between Maternal Smoking, Birth Weight, & Special Education

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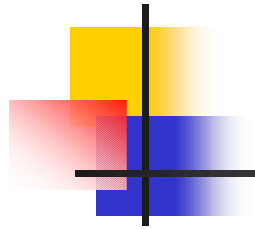
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Background

- The health risks associated with smoking have been well documented
- There is a growing body of research linking maternal prenatal tobacco use to both behavioral and academic problems in school
- This study is an epidemiological investigation of the effect of maternal tobacco use on risk for various developmental disabilities at 8-9 years old



Developmental Epidemiology

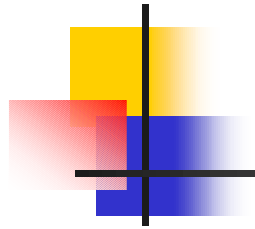
- ***Developmental epidemiology*** is the study of the distribution of behavioral outcomes in infancy and childhood and the indicators of their occurrence
- ***Risk factor*** refers to any characteristic of a person, place, or time
 - Identifiable prior to the event
 - Can be causal or a marker for other factors



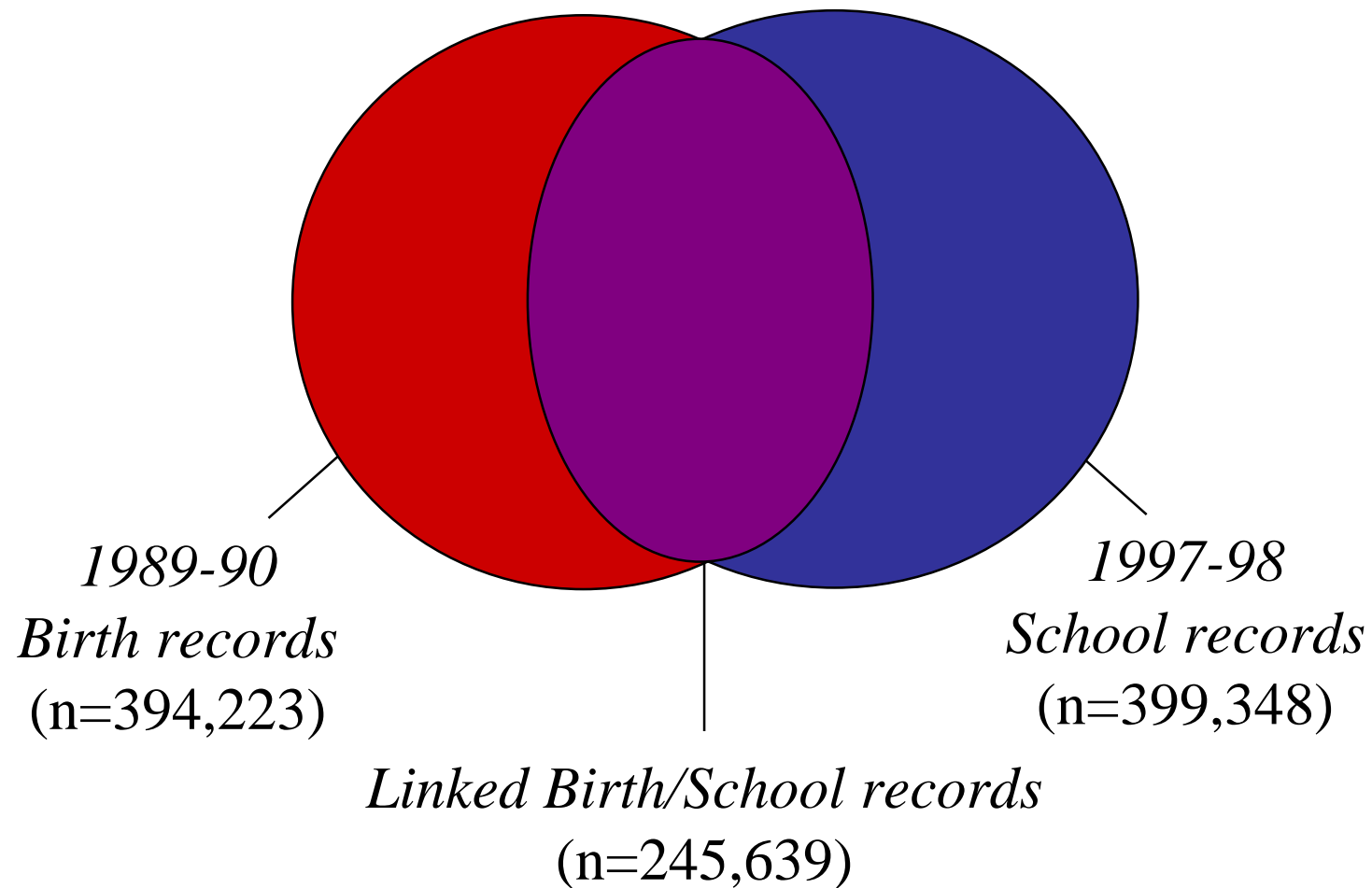
Epidemiological Methods

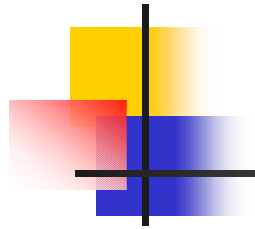
- Focus on proportions of cases
 - Low incidence conditions
 - Policy decisions
- Separate risk to individual from risk to the population

Risk Factor	Individual-Risk	Population-Risk
<i>Rare (LBW)</i>	High	Low
<i>Common (Poverty)</i>	Low	High



Data Linkage

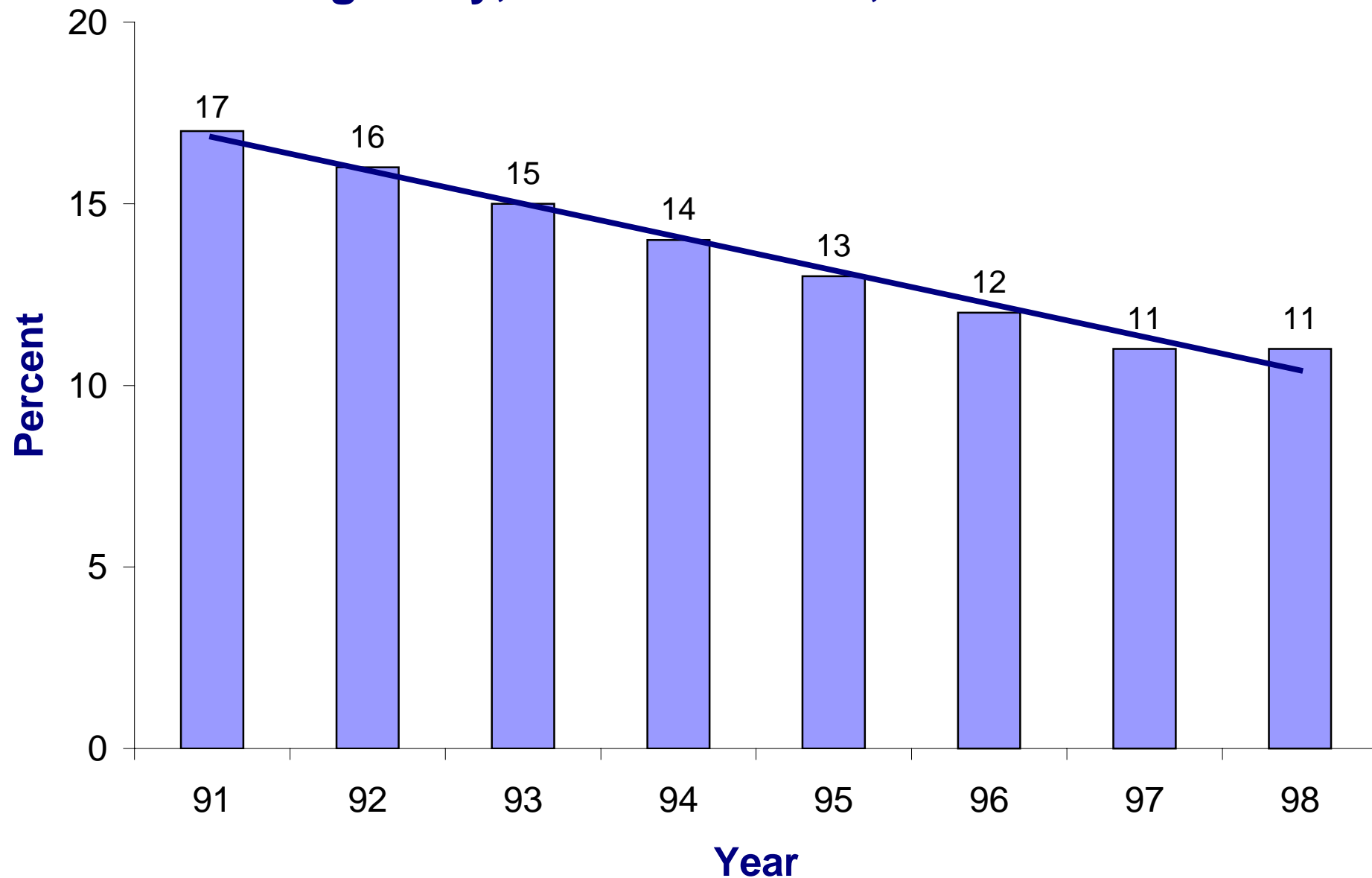




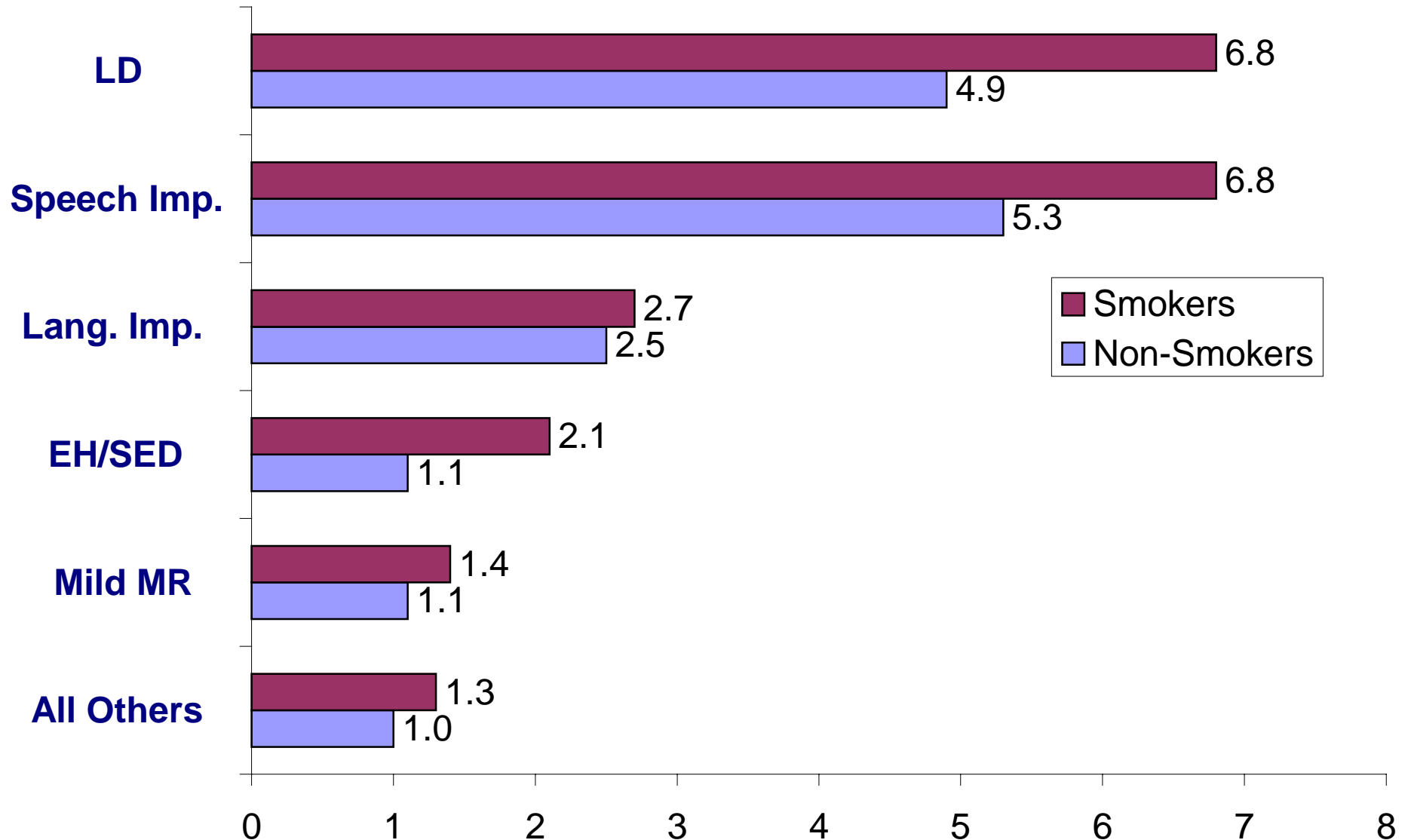
Sample

- Children in FL public schools during the 1997-98 school year who were born in FL in 1989-1990
- The children were 7 to 9 years old
- Total N = 245,639

Rate of Self-Reported Maternal Smoking During Pregnancy, State of Florida, 1991-1998

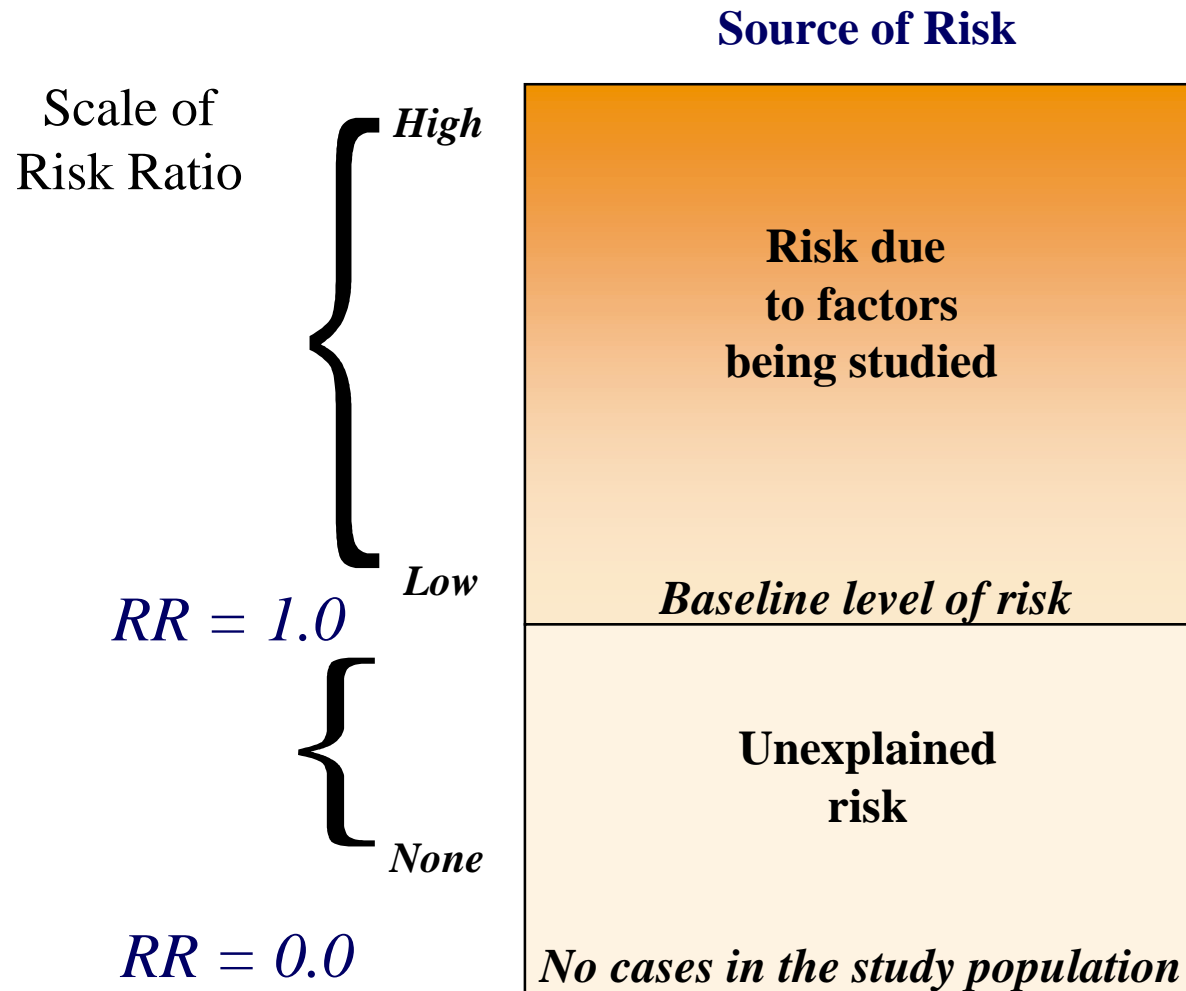


Rate of Various Exceptionalities Among Children Born to Smokers vs Non-Smokers

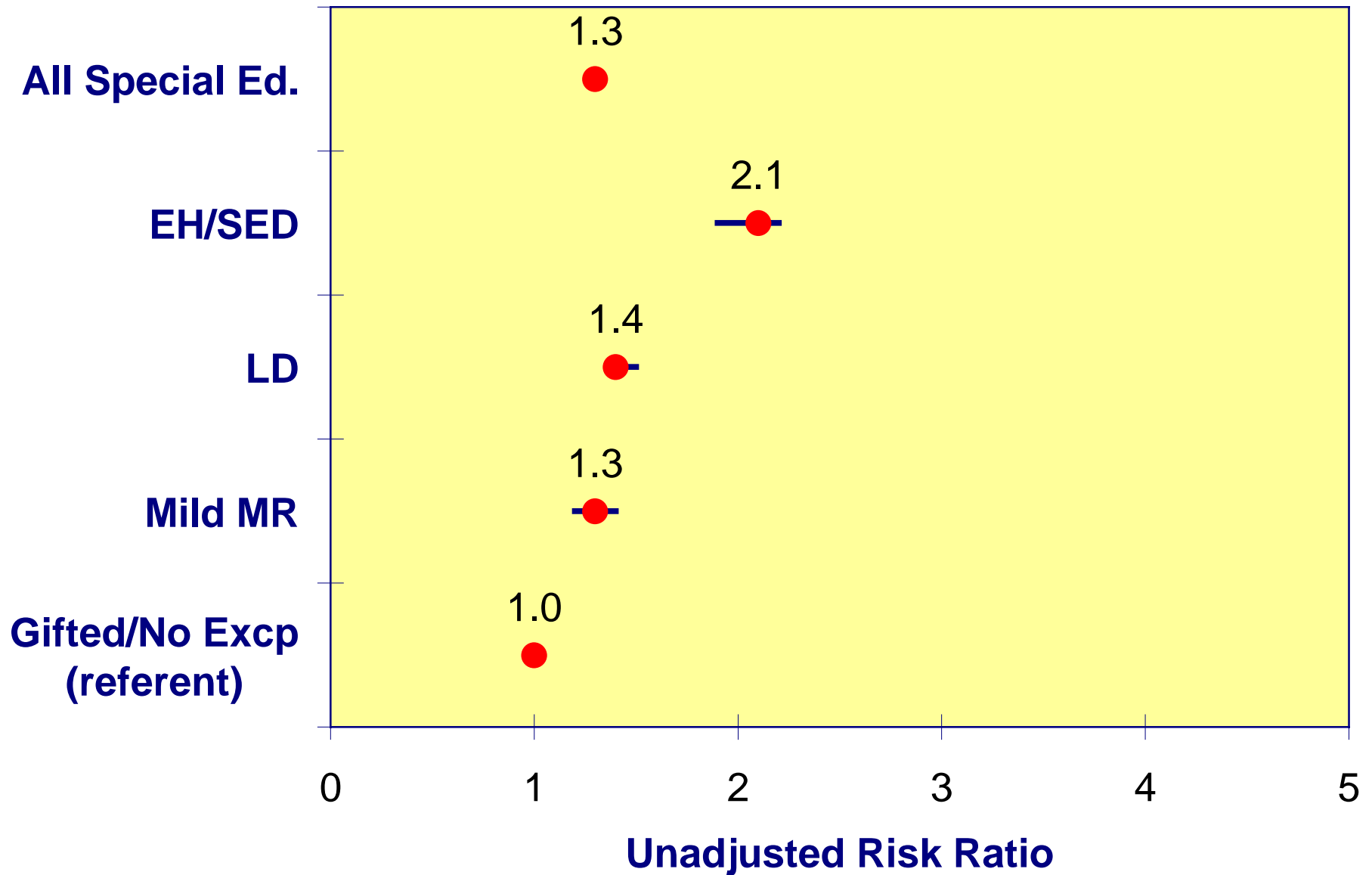




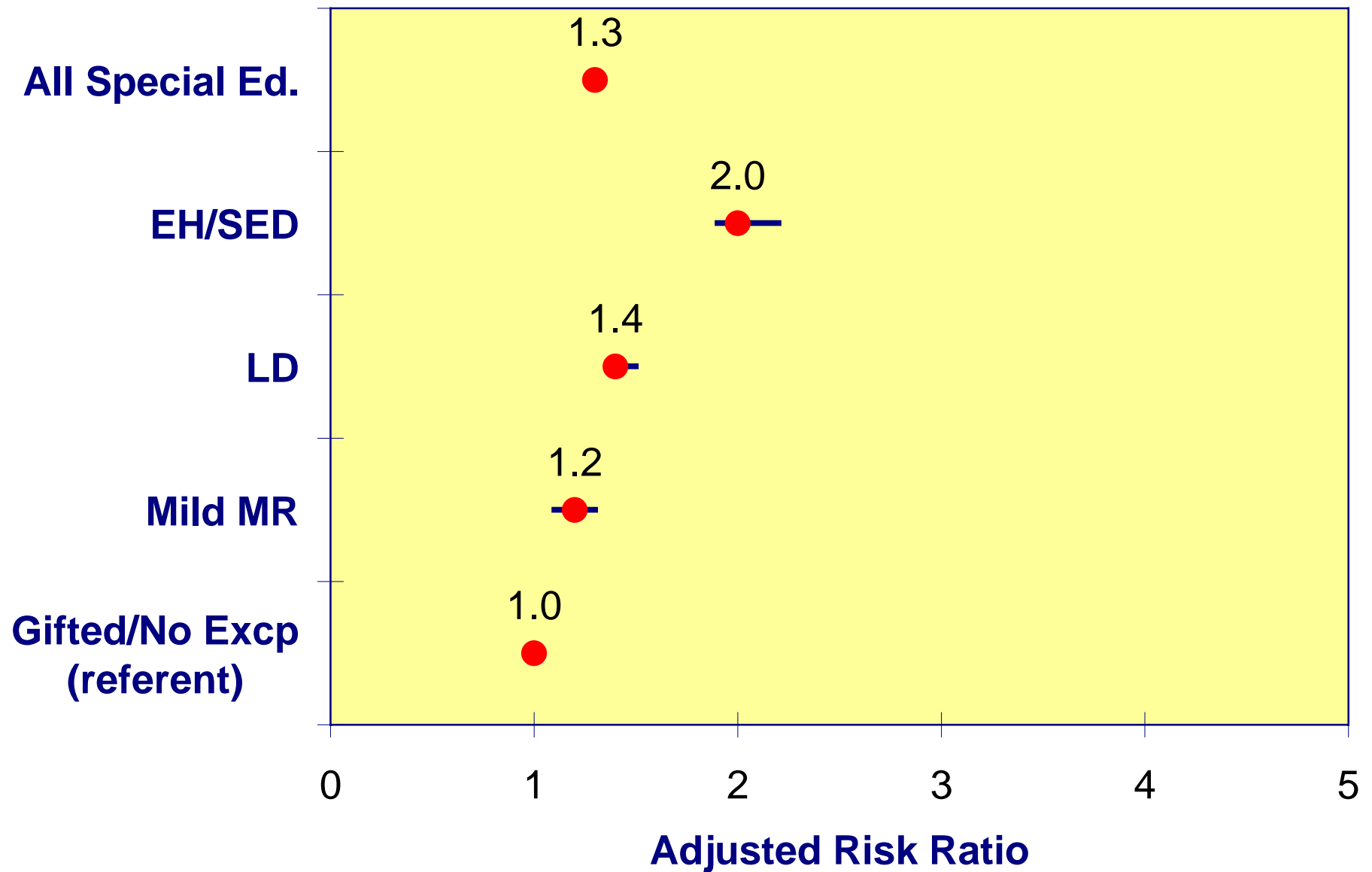
Epidemiological Concept of Risk



Simple Effect of Maternal Prenatal Tobacco Use



Effect of Maternal Prenatal Tobacco Use, Adjusted for BW





Population Attributable Fraction %

- Pulls together information about:
 - *Risk* associated with exposure to a risk factor (RR)
 - *Prevalence* of exposure to a risk factor (P_e)
- Weights risk ratio by the proportion of population that has experienced the risk factor

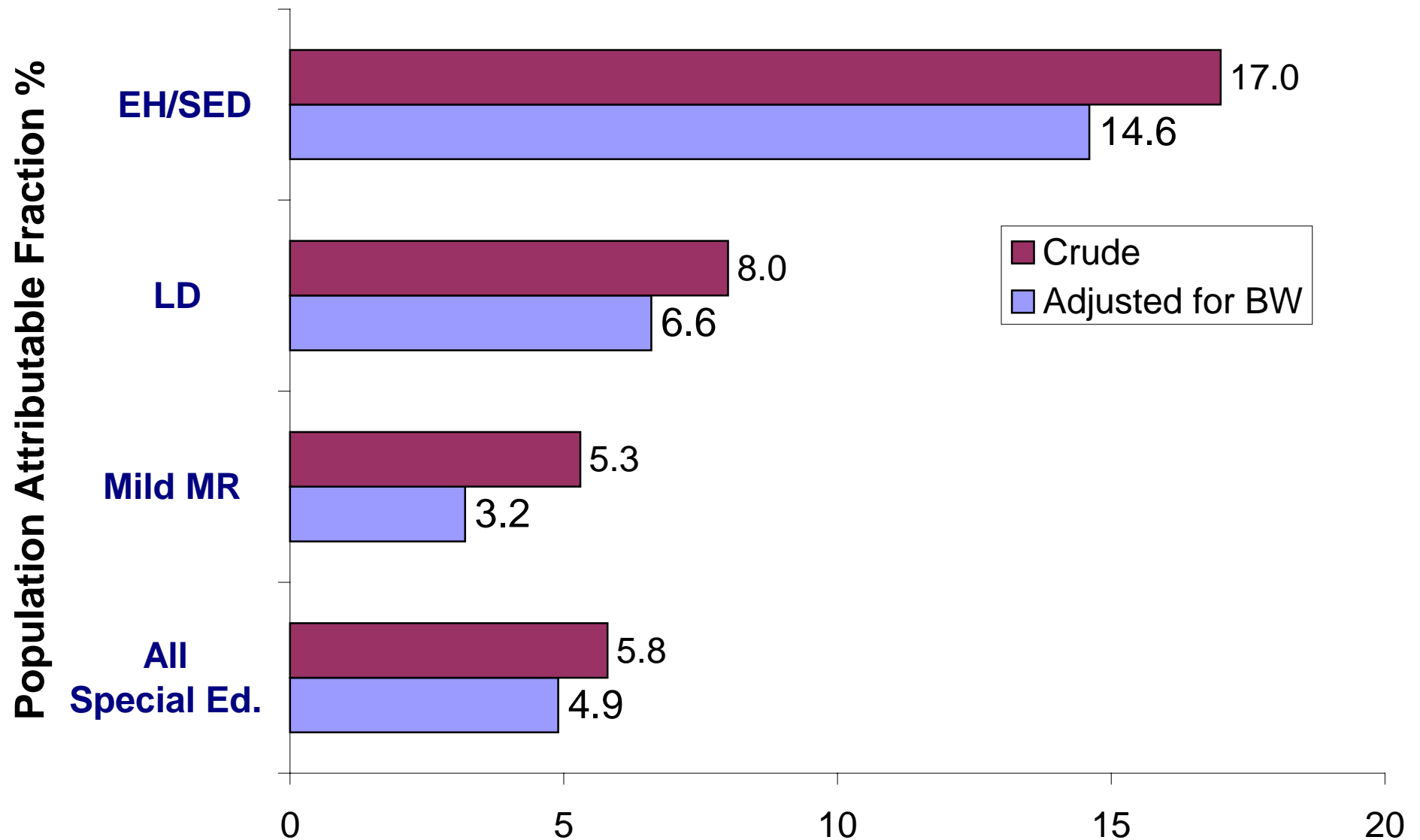
$$PAF \% = \frac{P_e(RR - 1)}{1 + P_e(RR - 1)} \times 100$$



PAF% Continued

- Proportion of cases *in the population* which are related to that risk factor
 - Reduction in cases if the rate in the risk group was reduced to the rate in the referent group
- Etiologic findings may direct useful strategies for prevention even when the biologic mechanism is not fully understood
 - Target services to group which is having the largest impact on overall rate in the population

PAF% Associated with Maternal Prenatal Smoking, Crude vs. Adjusted Values





Limitations

- Maternal self-reported tobacco use from the birth certificate record is an *underestimate* of the true smoking rate
- Prenatal maternal smoking is confounded by:
 - Postnatal maternal smoking
 - Pre- and postnatal paternal smoking
 - Use of alcohol and other drugs



Conclusions

- There is a substantial effect of smoking on developmental disabilities even after controlling for birth weight
- This effect varies by disability
- Future epidemiological studies need to examine:
 - Dose-response relationship
 - Other aspects of prenatal care